

**The Institution of Engineers, Australia
Engineering Heritage Australia
Plaquing Program**

**SOUTHERN CROSS WINDMILL
TOOWOOMBA, QUEENSLAND**



**Submission for a
Historic Engineering Marker
from
Engineering Heritage Australia (Qld)
Queensland Division
Institution of Engineers, Australia
2003**

The Institution of Engineers, Australia
Queensland Division

PLAQUING OF SOUTHERN CROSS WINDMILL
(Historic Engineering Marker)

CONTENTS

- Nomination Form
- Proposal
- Locality Plan
- Correspondence re owners approval to plaque the windmill

Commemorative Plaque Nomination Form

Date: 31 January 2003

To:

Commemorative Plaque Sub-committee
The Institution of Engineers, Australia
11 National Circuit
BARTON ACT 2600

From:

Engineering Heritage Australia
(Qld)
Queensland Division

The following work is nominated for an Engineering Heritage Marker award:

Name of Work: SOUTHERN CROSS WINDMILL, TOOWOOMBA,
QUEENSLAND

Location: Corner James Street (Warrego Highway) and Kitchener Streets,
Toowoomba

Owner: Toowoomba Metal Technologies, Tyco Southern Cross and
Toowoomba City Council

In support of the nomination the following information is provided:

- Proposal outlining the history, design and significance of the windmill together with the proposed wording for the commemorative plaque.
- Locality Plan
- Correspondence outlining the owner's, Toowoomba Metal Technology and Tyco Southern Cross, approval of the plaquing of the windmill, their agreement to be joint participants in the plaquing project, along with Toowoomba City Council's approval for site location and their participation in the plaquing celebrations.

The nominating body, in anticipation of this nomination being approved, has commenced discussions with the owners, and Toowoomba City Council, concerning a suitable presentation and unveiling ceremony.

This plaquing ceremony will be incorporated into the program for the Twelfth National Conference on Engineering Heritage to be held in Toowoomba from 29 September – 1 October 2003.

The Institution of Engineers, Australia, Queensland Division

Engineering Heritage Australia (Queensland)

Proposal for award of a Historic Engineering Marker for

Southern Cross Windmills, Toowoomba

Introduction

Toowoomba is a large Queensland rural city of over 90000 people perched on the escarpment of the Great Dividing Range 125km west of Brisbane. The city is central to a large farming area and, since 1871, has been the home of an important engineering enterprise. Most Australians know the enterprise by its brand name, *Southern Cross*, but generations of Toowoomba citizens know it as Toowoomba Foundry. Apart from the period 1884-1914 private companies controlled by the Griffiths family have owned the Foundry. In 1987 some shares in the private company, Southern Cross Corporation, were sold and by 1988 SCC was a subsidiary of Adsteam. In 1992 SCC was officially split into two, with the Toowoomba Foundry evolving to become Toowoomba Metal Technologies in 2001, and Southern Cross Machinery evolving to become the Southern Cross business of the Flow Control Division of the US multi-national Tyco.

The most visible legacy of the Griffiths, Toowoomba Foundry, TMT and Tyco Southern Cross are the hundreds of thousands of *Southern Cross* windmills scattered across Australia, and overseas. We propose to mark the 127 years of development and production of the Southern Cross windmill with a Historic Engineering Marker.

History

From its humble beginnings in 1871 when George Washington Griffiths opened an ironmongers shop, the Griffiths family business Toowoomba Foundry has manufactured an extraordinary range of products. Stationary steam engines and boilers, diesel and petrol engines, pumps, hay, chaff and wool presses, chaff cutters, iron lungs, railway locomotives and wagons, aeroplanes, lawnmowers, windmills and irrigation equipment are but a few of the products that have been made.

Windmills have played a major role in the Foundry's history since 1876 when Griffiths Bros & Co manufactured four windmills for Jimbour Station based on US built windmills already owned by Jimbour. These mills were some of the first windmills manufactured in Australia. By 1886 Griffiths were doing their own design work and patenting modifications to their mills. All of the mills they built prior to 1893 had wooden wheels on the downwind side of a wooden tower, had few metal parts, and the pump was driven by a crank. Table 1 lists the basic models of windmill produced in Toowoomba between 1876 and 2003.

Table 1: Summary of Windmills manufactured between 1876 and 2003 in Toowoomba.

Date	Name	Materials		Mechanism	Blade down wind or upwind	Wheel Size (ft)	Designer
		Wheel	Tower				
1876-1884	<i>Economy</i>	wood	wood	crank	d/w		<i>Copy of a US mill</i>
1884-1886	<i>Improved Economy</i>	wood	wood	crank	d/w		na
1886-1893	<i>Patent Economy</i>	wood	wood	crank	d/w		Griffiths patent
1886-1893	<i>Simplex</i>	wood	wood	crank	d/w	16 & 20	Griffiths patent
1889-1893	<i>Little Wonder</i>	wood	wood	crank	d/w	12	Griffiths patent
1893-1900	<i>Zephyr #1</i>	wood	wood	spur geared	u/w	8 to 14	JA Griffiths patent
1900-1901	<i>Zephyr #3</i>	steel	steel	spur geared	u/w	8 to 14	JAG & H Eastgate <i>Modified US "Gem" wheel</i>
1902-1903	<i>Eureka</i>	steel	na	spur geared	u/w	8 & 10	GH Griffiths
1903-1911	<i>S Cross 1903</i>	steel	steel	internal gear	u/w	7 to 16	GH Griffiths
1911-1921	<i>S Cross 1911</i>	steel	steel	internal gear	u/w	8 to 20	GHG & CP Jessop
1913-1915	<i>S Cross 1913</i>	steel	steel	gear or crank	u/w	16 to 25	GH Griffiths
1915-1922	<i>S Cross 1915</i>	steel	na	crank	u/w	18 to 30	GH Griffiths
1916-1920	<i>S Cross 1916</i>	steel	c. iron	crank	u/w	12 to 16	GH Griffiths
1920-1925	<i>S Cross A</i>	steel	c. iron	crank	u/w	12 to 16½	W Boshammer
1925-1929	<i>S Cross AB</i>	steel	steel	crank	u/w	12 to 16½	na
1925-1930	<i>S Cross AE</i>	steel	steel	crank	u/w	30	GH Griffiths
c1923	<i>S Cross E</i>	steel	steel	crank	u/w	35.83	GH Griffiths
1921-1927	<i>S Cross C or G</i>	steel	steel	internal gears	u/w	7 to 12	W Boshammer
1922-1925	<i>S Cross C or F</i>	steel	steel	internal gears	u/w	7	W Boshammer
1925-1930	<i>S Cross H</i>	steel	steel	internal gears	u/w	8 to 12	GHG & A Lindley
1940-1955	<i>S Cross AG</i>	steel	steel	internal gears	u/w	14	A Lindley
1929-date	<i>S Cross R</i>	steel	steel	crank	u/w	14 to 30	GHG, WB, & AL
1930-1953	<i>S cross Z</i>	steel	steel	internal gears	u/w	6 to 14	W Boshammer <i>Modified US Aermotor wheel</i>
1953-date	<i>S Cross IZ</i>	steel	steel	internal gears	u/w	5 to 14	na
1955-1973	<i>S Cross JA-E</i>	steel	steel	crank	u/w	14	na

In 1893 the *Zephyr* mill, designed by J A (Alfred) Griffiths, was the first geared windmill manufactured in Australia. As well as being geared for easier starting, the *Zephyr* had a wheel on the upwind side of the tower, but was still of wooden construction. A geared windmill uses gears in the engine to increase the rotational speed of the windmill's wheel before converting the circular motion to the plunger motion. This is in contrast to a direct action mill in which the windmill's circular motion is converted to the plunger motion by means of a crank. One turn of the wheel converts to one complete up-and-down stroke. In 1920 all Southern Cross designs with wheels 14ft and over were direct action while those 10ft and below were geared while the 12ft mills could be ordered either geared or direct action. With the current IZ mills both the 12ft and 14ft wheels are geared. The overlap between geared and direct acting mills was to allow for deep bores which need slower pumping and more torque, as against low lift situations.

In the early 1900s the *Zephyr* was succumbing to pressure from much cheaper American windmills so in 1903 G H (Bert) Griffiths designed a new mill of extreme simplicity and robustness. He had observed that the Foundry's windmills on display at the Toowoomba Show ran at about half the speed of those of his American competitors. He measured their wheels and concluded that his sails had too much curvature in them. His new design incorporated blades with a flatter profile, internal gears, and an ability to govern itself.

The *Southern Cross* windmill, as designed and named by Bert Griffiths, became one of the great successes of the Toowoomba Foundry. This mill was such a simple, inexpensive and efficient mill that, by 1910, it had almost eliminated American mills from the Australian market.

Before 1903, each windmill design was given a different name but the success of the *Southern Cross* design led to the decision to retain the name for all future windmills, and, quite soon, the name was applied to all products of the Foundry. The windmill's success allowed the Foundry to regain stability and profitability after losing Queensland Government railway locomotive contracts to Ipswich in 1902.

As per the following abstracts from the Southern Cross Catalogue 'E' -July 1909, the success of the 1903 designed windmill was augmented with a strong and positive marketing promotion highlighting the windmill's advantages together with the Company's expansion proposals.

"Southern Cross Water Supply Plants

TO OUR MIND the principal use of illustrations and printed matter describing an article is to enable the buyer to know exactly, as regards value and details of construction, what he is purchasing. With this object in view then we have in this our Catalogue "E", endeavoured to set out clearly, in the fewest possible words and by the aid of illustrations showing each part distinctly, the salient features of the Southern Cross Windmill and also the full line of pumps, troughing, etc., which we manufacture.

In addition to mere technical details, it has been our desire to give such information that a buyer at a distance may be able to decide for himself just what size windmill he requires to pump from any given depth, a sufficient number of gallons daily to supply his stock; further that he may be able to plan out the tank capacity, the length of troughing; the size of float valve and the necessary connections, etc., which must be part and parcel of his prospective water supply plant.

Since our previous catalogue was printed some 2½ years ago success has been ours to a very marked degree, sales having advanced steadily month by month-our output almost doubling itself yearly-and keeping pace with this there has been a continuous stream of new ideas and improvements embodied in the mills etc., themselves.

Mention must be made of recent additions to our plant and equipment. It stands as a reasonable argument that the concern with the best plant can turn out the best product, and this is our excuse, if excuse be needed, for mentioning our plant in connection with a treatise on water raising by means of The Southern Cross Windmill.

This is our claim-and it is no idle boast that we have the most modern Machinery in Australia, and also that our plant is equal to the best in any country. To provide for extensions to our Toowoomba plant we have just completed (for cash) the purchase of 7½ acres of land adjoining and fronting our main railway siding. Again, during our past year, to cope with our orders from New South Wales and other States, when shipment by sea has to be made, land has been purchased works started in Sydney.

The Southern Cross Windmill starts off therefore with the initial advantages of being made more accurately and at a lower cost than any other.

The Popularity of the Southern Cross

Of the four or five types of Toowoomba windmills which have been sold during the past 35 years, not one has been turned out which did not have a great pumping capacity, and the freedom from breakage in all types has been proverbial. The first steel-gear windmill in Australia came from our works many years ago, but no attempt was made to sell this mill beyond a limited area. After many and costly experiments on which thousands of pounds have been spent, the Southern Cross Mill was perfected some four or five years ago and with its advent came the determination that our works would be entirely devoted to the manufacture of the windmill. From the day of the first sale success has been assured so that even in this short time, the Southern Cross mill has got widely known and Sales now exceed Two Thousand yearly. No further recommendation is necessary than this that we do the business and that if the Southern Cross mill were not everything that we claim for it, and perhaps more, we would not have already thousands of satisfied buyers, and an ever increasing circle of customers.

Oil and Grease

Unsuitable lubricants are too often used, and we have therefore selected a suitable good-bodied machinery oil which we have named Southern Cross Windmill Oil, and which we sell in one gallon tins. This we confidently recommend as it is a first grade oil, and a good lubricant means easier running and consequently, more water in the day, and it also lengthens the life of the mill. Southern Cross Grease we have also selected for its special work. We put it up and sell it in 5lb tins.

“A tin of oil and grease is always a good investment with every mill.”

The *Southern Cross 1911* mill superseded the 1903 mill and it had a patented automated oiling system which “oils itself for nine months”. The *Southern Cross 1911* windmill was first marketed under the tradename *Enterprise* and sold as the product of the Australian Wellworks of Sydney. This ruse was to make sales to some large customers who would not buy *Southern Cross* windmills.

In 1929 the *Southern Cross R pattern* direct acting mill was designed, and was named *Seneschal* which is Latin for an old servant. This mill has every working part enclosed and it is oiled positively. Its windwheel is entirely galvanised and the mill is mounted on a galvanised steel tower. *Seneschal* is a good name for a mill with a long life, and a design which can still be ordered.

The *Seneschal* was followed in 1930 by the geared *Southern Cross Z pattern* mill and these mills, with one redesign, are the same as the Southern Cross mills marketed today. Bert Griffiths readily acknowledged that the windwheel of the *Z pattern* was a copy of the Aermotor (Chicago) wheel with slight modification. This mill was immediately popular and the advertisements for them carried the words “When the last letter becomes the last Word”. In 1955, after 22 years of production, the *Z pattern* mill was made easier to service and easier to operate and was designated the *IZ pattern*, where *I* symbolised *Improved*. The *IZ* mill is still produced, almost a half-century after its introduction!

The *Southern Cross 1903 pattern* windmill was the forerunner of a whole range of windmills, improved over the years through research and design, that were manufactured and sold under the trade name of *Southern Cross* for 100 years.

In 1990 a milestone was reached with the production tally of 200,000 windmills being reached since production first started. Up until 1992, each mill was stamped with a unique serial number. From 1992 onwards, each mill is stamped with a number that identified the day, month, year and the mill number assembled on that day. Regardless of numbering procedure Southern Cross mills have always been manufactured in batches. Windmill sales from 1876 to 2003 are shown in Table 2.

Table 2: Windmill Production 1876 to 2003

Period	Windmills	Period	Windmills
1876-1921	~20 000	1960-1964	15 035
1922-1929	~ 15000	1965-1969	12 564
1930-1934	7 330	1970-1974	7 927
1935-1939	18 217	1975-1979	3 671
1940-1944	24 725	1980-1982	4 093
1945-1949	31 976	1983-1990	~ 10000
1950-1954	31 091	1990-2003	~ 3000
1955-1959	18 773		

Statement of Significance

The Southern Cross Windmill is a product, which from its design and inception a century ago, has stood the test of time and as such has survived and outlasted its competitors, be they in this country or from overseas. The Southern Cross windmill was originally designed to compete with American windmills that, at the turn of the twentieth century, were attracting much interest for their cheapness and performance. This prompted G H Griffiths of the Toowoomba Foundry to initiate the design and production of a cheap mill to compete with the American mills. The "Southern Cross" windmill has been improved over the years through the research and design innovations of Foundry personnel. Since its inception the windmill has been produced in varying models, both geared and direct acting, and with a wide range of wheel sizes. The design has been upgraded and modified, where necessary, to suit manufacturing capabilities and customers. The current gearbox design for the "IZ" range dates from 1953. Although the demand for windmills has declined, they are still a cheap, reliable, ecologically sustainable power source for pumping water. Windmills are still common in areas remote from electric power, both in Australia and overseas.

Southern Cross windmills serve as a monument in Australia's rural development, to the hardships and the ingenuity of the pioneers, and, not least of all, to the establishment of 'Southern Cross' as a brand of quality agricultural products.

Proposed Plaque Wording

HISTORIC ENGINEERING MARKER

THE SOUTHERN CROSS WINDMILL

G H (Bert) Griffiths of Toowoomba Foundry designed and named the "Southern Cross" windmill in 1903. Design modifications over the twentieth century improved its economy, its efficiency, and simplified its maintenance. Over 200 000 Southern Cross windmills have been manufactured with windwheels ranging from 1.5m to 10.9m diameter. The erection of this IZ Pattern mill marks the centenary of the Southern Cross mill. Windmills are an environmentally sensitive source of power for pumping water. They are a monument to the ingenuity of our engineers, manufacturers, and farmers.

The Institution of Engineers Australia
Toowoomba Metal Technologies Tyco Southern Cross
and Toowoomba City Council, 2003.

References

Laurent, Rob. 2002, *Southern Cross Engines*, Blue Flyer Publishing, Highfields, Queensland.

Millett, Bruce 1984, 'Triumph of the Griffiths Family', in *They Meant Business: An Illustrated History of eight Toowoomba Enterprises*, Darling Downs Institute Press, Toowoomba.

Griffiths, Albert Atherton July 1909, *Southern Cross Catalogue 'E'*

HARLAXTON

MOUNT LOFTY

Tourist Information Centre
86 James Street,
Toowoomba

Phone:
1800 33 11 55

Toowoomba Foundry

Cabb & Co.

★

BOTANIC GARDENS

QUEENS PK

ST VINCENTS

EAST TOOWOOMBA

Plaque Site

TOOWOOMBA

CENTENARY HEIGHTS

TOOWOOMBA GENERAL

SOUTH TOOWOOMBA

TOOWOOMBA

TOOWOOMBA

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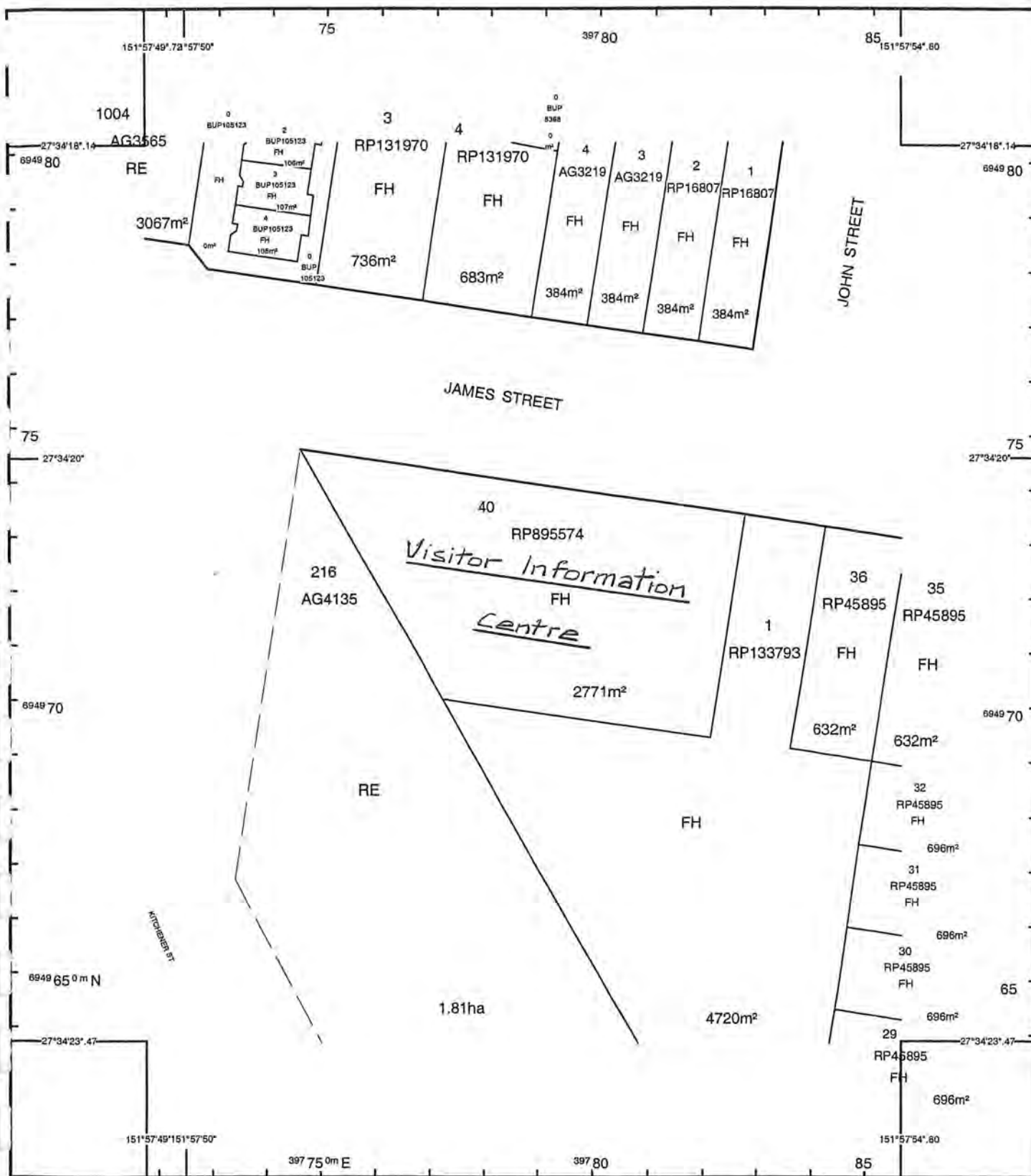
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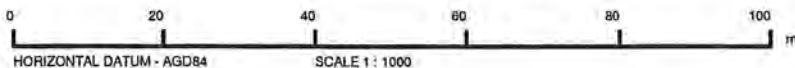
TOOWOOMBA

TOOWOOMBA



STANDARD MAP NUMBER

9242-11241



MAP WINDOW POSITION &
NEAREST LOCALITY

151°57'52"
27°34'21"
SOUTH TOOWOOMBA
1.11 KM

SUBJECT PARCEL DESCRIPTION

OCDB
Lot/Plan 40/RP895574
Area/Volume 2771m²
Tenure FREEHOLD
Local Government TOOWOOMBA CITY
Locality RANGEVILLE
Parish DRAYTON
County AUBIGNY
Parcel/Segment 171/2788

CLIENT SERVICE STANDARDS

PRINTED (dd/mm/yyyy) 4/4/2003
(Important Notice: The Information
hereon is NOT an OFFICIAL RECORD and
its ACCURACY is NOT GUARANTEED)
DCDB 03/04/2003
For symbology see the BLIN Abbreviations
Sheet.

LEGEND

SmartMap

An External Product of the
Basic Land Information Network.

Based upon an extraction from the
Digital Cadastral Data Base



**Queensland
Government**
**Natural Resources
and Mines**

(c) The State of Queensland,
Department of Natural Resources & Mines, 2003.



19 FEBRUARY 2002

RECEIVED

20 FEB 2002

MR R. MOORE
EXECUTIVE DIRECTOR
THE INSTITUTION OF ENGINEERS, AUSTRALIA
QUEENSLAND DIVISION
447 UPPER EDWARD STREET
BRISBANE QLD 4000

Richard
Dear Mr Moore,

PROPOSED HISTORICAL ENGINEERING MARKER IN TOOWOOMBAA

I refer to your letter of 4 February 2002 advising of the Institution's proposal to recognise the Southern Cross Windmill as a significant engineering work and its contribution to rural development across Australia, during the 12th National Conference on Engineering Heritage being held in Toowoomba in October 2003.

I wish to advise that Council has agreed to provide use of the land to the west of the Visitor Information Centre in James Street for the siting of a Southern Cross Windmill as part of the Institution's Australian Historic Engineering Plaquing Programme.

It is noted that you propose that this project be undertaken as a joint venture between Council, Tyco Flow Control, Toowoomba Metal Technologies and the Institution, and that a committee will be formed to further this project. Council's Manager, Asset Management, Mr Tom Redwood, would be representing Council on the committee. He can be contacted on telephone (07) 46 886727, facsimile (07) 46 886431, email T.Redwood@toowoomba.qld.gov.au.

Yours faithfully,

Peter Taylor
PETER TAYLOR
CHIEF EXECUTIVE OFFICER

FREQUENT

ABN 69 653 021 471

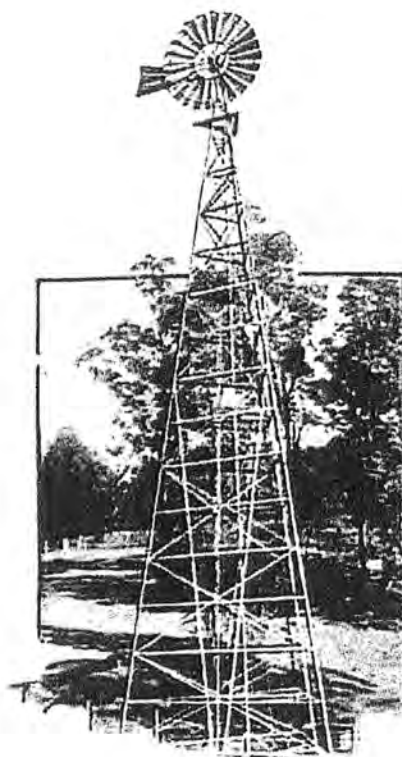
543 Ruthven Street
Toowoomba Qld 4350

Address all communications to:

P.O. Box 3021
Village Fair
Toowoomba Qld 4350

Telephone: (07) 4688 6603
Facsimile: (07) 4688 6632
DX 41103 Toowoomba

The Office Of The Chief Executive



In selecting

A Windmill

choose one of established reputation selling at a moderate price, one that is a POWERFUL PUMPER and automatically oils itself for NINE to TWELVE months with ONE oiling. All of these features are to be found in the

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You cannot go wrong if you do as others did last year
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Order a Southern Cross plant.

Quotations and Catalog are yours for the asking.

C Mention this number in your reply to get a fine price.

The Toowoomba Foundry Co., Ltd.

TOOWOOMBA.